

Re: Development of computer analysis systems

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- *From:* hrrubin@xxxxxxxxxxxxxxxxxxxxxx (Herman Rubin)
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In article <qGcEj.24098\$R84.18062@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, Nasser Abbasi <nma@xxxxxxxx> wrote:

"Herman Rubin" <hrrubin@xxxxxxxxxxxxxxxxxxxxxx> wrote in message [news:frdhn\\$1fj4@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:frdhn$1fj4@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx)

Symbolic computation is useful in numerical computation, and that is very useful in graphics, but the other way does not work well, but it is of use. Computers are superfast subimbeciles, and should be treated as such.

Agree that symbolic is useful (in numerical) work, but only for problems of small size.

Disagree. Problems of fairly large size can profit from it, and solutions to small size problems are often useful in problems of large size.

One also has to use small size problems to debug for large size.

For school project I wrote a small finite elements program, where I kept everything in symbols, i.e. the stiffness matrix remained fully symbolic, all the integration was kept symbolic, etc., but it was too slowww, and for anything more than few elements, it would take an hour or more on my PC and would become short of memory fast (it was a one year old PC, not one of the new multi-core Intel ones).

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This I can well believe. For "production" runs, it is generally better to find a way to use the smaller precision computer hardware than to use a symbolic program at all. I believe the main packages allow a Fortran or C compilation.

When I told Mathematica at the start to use numerics (for example, write "10." instead of "10", and use NIntegrate instead of Integrate, etc...) the finite elements program would run much much faster and what was taking one hour would take less than a minute.

I have even had Mathematica make a major error by using 13 instead of 13. and 15 instead of 15.; it decided to use an "exact" procedure, however using a packaged value of an irrational with not enough accuracy. I did not tell it to compute that way.

I think using CAS here was useful for me here to 'see things' better, but when it comes to doing something in practice, it seemed to me it is still too slow to use symbolic all the way for numerical work. May be the multi-core CPU's coming out would help here?

Nasser

ps. I hope I understood what you meant by using symbolic in numerical computation as meaning something as the above.

It is rare that I would use a CAS for a big numerical calculation. I am quite aware that the way the symbolic packages do arithmetic may even be worse than the way I would do multiple precision arithmetic; I would not bother with doing it decimally, but keep it all in hex.

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This address is for information only. I do not claim that these views are those of the Statistics Department or of Purdue University.
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